



Aperia TECHNOLOGIES The Future Has Arrived IoT User Guide

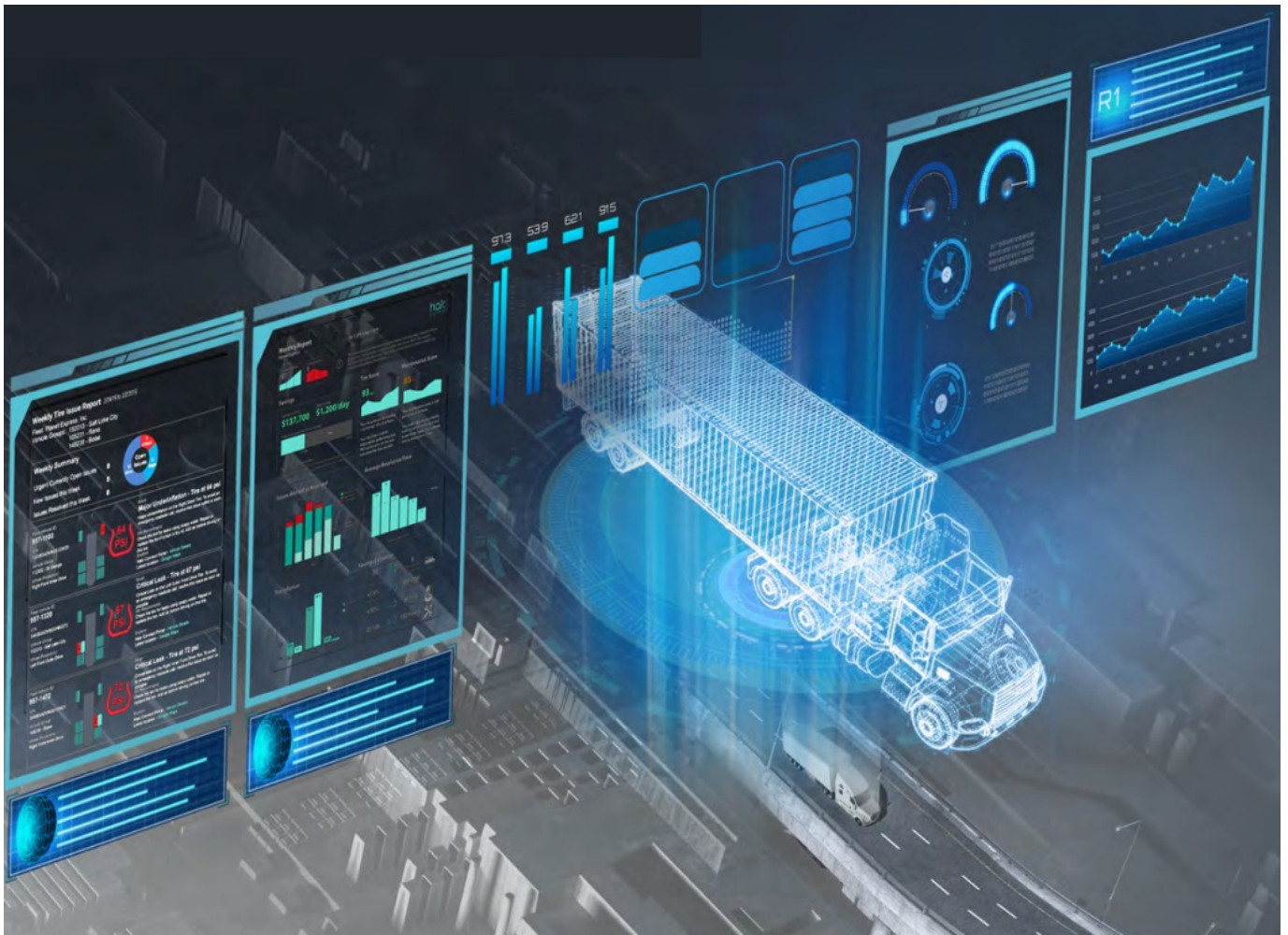
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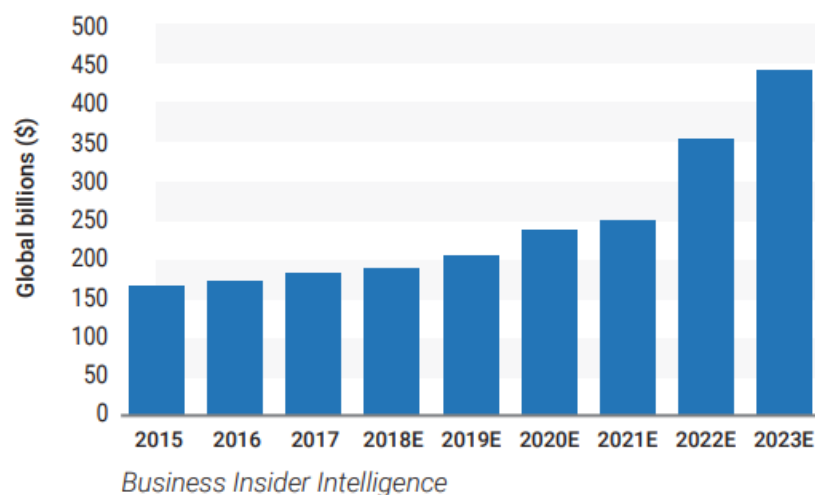


SPECIAL REPORT

The statistics behind the “Internet of Things” (IoT) are almost as dizzying as the possibilities. By the middle of this decade, the freight transportation and logistics industries are projected to have generated an extra \$1.9 trillion in value over a 10-year period by leveraging real-time data and operating efficiencies through IoT. (1)

That staggering projection explains why transportation, manufacturing, and utility companies have spent a combined \$120 billion on IoT systems and services in recent years.

These investments will continue to accelerate, with more than 75 billion separate devices expected to be interconnected through IoT and cloud computing platforms across the globe by 2025.



For the trucking industry, connectivity, machine learning, and artificial intelligence technologies are beginning to revolutionize maintenance practices. With the aid of real-time telematics data and analytics, fleets can begin to

shift to a predictive maintenance program, from the reactive or preventative plans that are commonplace today. This transition can boost vehicle utilization and driver satisfaction by identifying emerging problems before they become larger headaches, and allow for scheduling maintenance only when it is truly required. However, this process takes time to implement, especially with more sensors being added to more tractor-trailer components every day.

It can be difficult to navigate how best to get started, especially if various systems do not communicate with each other. For example, if transmission sensors and engine sensors do not combine to issue useful information to operators, it will be difficult to move the powertrain to a predictive maintenance rhythm.

So, the best first step is to consider the equipment that not only requires a high level of maintenance, but also causes the greatest damage when it fails. When considering these factors, it becomes clear that tires are the logical choice for an IoT-related investment. The initial focus on tires offers the most rapid and valuable return-on-investment, as the data can be leveraged to tackle pain points immediately.

With the aid of real-time data and analytics, fleets can begin to shift to a predictive maintenance program.

What Is the Internet of Things?

The Internet of Things (IoT) refers to the growing network of vehicles and physical devices embedded with sensors or software that can automatically gather and transfer data over a wireless network. These platforms allow for the management of practically an infinite number of devices across multiple technologies and sources, including from third-party sources.

For fleets, connected IoT sensors can provide real-time data on parts, and send diagnostics to the home office of possible mechanical failures.

The electronic logging devices (ELDs) required to be used in nearly all interstate trucks to monitor drivers' hours-of-service (HOS) are examples of IoT connectivity. ELDs are connected to the engine, and can automatically report information back to fleet managers or law enforcement if requested.

What Does This Mean for Trucking?

Some of the real-world benefits of using IoT are obvious. It is imperative that trucks transporting COVID-19 vaccines and other critical medicines arrive without delays, and be kept within certain temperature ranges. So it's not an overstatement that IoT is saving lives every day.

While few trucks are transporting anything quite as significant as vaccines, ensuring every shipment arrives safely and on-time at its destination is always a top priority. For many fleets, however, new technologies can be a double-edged sword, with the excitement of unlocking savings and boosting productivity quickly giving way to the reality of information overload.

"Overwhelmed" is a word fleets often use in describing how they feel from all of the data generated from countless sensors being added to the rapidly growing number of connected trucks. There are brake sensors, pressure sensors, HVAC sensors, engine sensors, and dozens of others. Each of these can provide benefits from better data and monitoring, but are far from equal when focusing on the frequency and severity of component failures.



The insurance industry is most concerned with what they classify as "high-severity and high-frequency" incidents; those that are almost certain to occur and would be more likely to have devastating outcomes when they happen. (2) Even "high frequency" events that are considered "low severity" raise red flags. For the fleet that has a high number of fender benders, logic suggests its safe driving practices are insufficient, and it is inevitable a more serious accident will happen.

These same high stakes apply to the health of your tires which top the frequency and severity lists.

Underinflated tires are a foreshadowing of premature tire wear, tire failure, or even a tire-related accident in the future. That can be seen in statistics from the National Highway Traffic Safety Administration (NHTSA), which show 35% of accidents attributed to "vehicle malfunctions" are primarily attributed to tire-related problems. (3)

Tire-related problems cause 35% of accidents related to vehicle malfunctions.

	Estimated (Based on 2% of the NMVCCS crashes)	
Critical Reason	Number	Percentage* ± 95% conf. limits
Tires/wheels-related	15,000	35% ± 11.4%
Brakes-related	10,000	22% ± 15.4%
Steering/suspension/transmission/	15,000	3% ± 3.3%
engine-related	17,000	40% ± 24.0%
Other/unknown vehicle-related problems	44,000	100%

*Percentages are based on unrounded estimated frequencies (Data Source: NMVCCS 2005-2007)

A main reason behind this troubling figure is how significant a problem tire underinflation is throughout the industry. Studies by the Technology & Maintenance Council (TMC) of American Trucking Associations (ATA) found one out of five commercial vehicles are operating with one or more tires underinflated by at least 20 pounds per square inch (psi), and that only 46% of all tractor tires and 38% of all trailer tires are within plus or minus 5 psi of the target pressure.

TMC recommends that any tire found to be inflated to less than 80% of target pressure should be inspected, and that a tire underinflated by 50% or more should be considered flat and taken out of service.

Even a single underinflated tire could lead to a sudden blowout, preventing the driver from completing a safe, on-time delivery. The downtime caused by an emergency road call could lead to additional delays and lost revenue if the driver runs out of hours of service while still out on the highway.

Why Transition to Predictive Maintenance?

Most fleets today take a preventative approach to maintenance – pulling a truck off the road for scheduled service based on a predetermined number of miles or hours in operation.

Of course, if a problem is not caught in time, what started as a minor issue can rapidly snowball into a more expensive repair that forces a vehicle out of service for an extended length of time.



Unlike a reactive system, predictive maintenance shifts the focus to data-driven decisions. Instead of repairing a truck as something breaks, data can help spot and fix a potentially weak link in advance.

Many fleets are already spending tens of thousands of dollars every year purchasing new tires and installing them on vehicles.

By protecting tires with Halo Connect from Aperia Technologies, the system eliminates the risk of human error and minimizes the costly servicing of tires to when it is most convenient and economical for a carrier.

By coupling active inflation with machine learning, fleets utilizing Halo Connect are trimming unplanned tire-related downtime by an estimated 90%. The result is a decrease in on-road breakdowns, reduced technician diagnostic time, and increased automation of routine tasks.

With Halo Connect, fleets are no longer reliant on time intervals and historical assumptions, and tire maintenance shifts to a predictive model based on specific data and actual utilization.

Why Start With Halo Connect?

Tire failures occur often, and with significant consequences. Tires also need to be checked and maintained more than any other component on a truck and therefore stand to disproportionately benefit from the addition of automation paired with sensors and analytics. And Halo Connect offers just that: automatic tire inflation and predictive tire management in one package.

By constantly managing tire pressure and alerting when tire health is jeopardized, Halo Connect eliminates human error and simplifies processes for drivers and other employees alike. It extends the lifespan of tires by reducing wear and tear from underinflation and improves overall driving performance and fuel efficiency by ensuring optimal pressure.

If a more serious issue is likely to occur, the system notifies maintenance personnel to begin preparations for a repair process that will minimize downtime and help technicians focus on the highest priority repair work.

Halo Connect's machine learning assesses countless variables such as geography, temperature, and pressure profile to diagnose and categorize tire issues by severity, which assists in cost-effective maintenance planning. Data is continually captured by the system and compared with historical markers to spot early warning signs of potential failures and plan the right time for maintenance. It can also help determine the best tire make and model for individual vehicles, based on duty cycles, routes, shipments, and other factors.

By alerting to potential problems early, but not often, Halo Connect develops a high degree of user trust and engagement.

This addresses a common complaint among fleets investing in new technologies — too many false warnings with incomplete information, which causes drivers to tune them out, undercutting the value of the system.




At the same time, Halo Connect is actively monitoring tire pressure, its proprietary algorithms were built on top of billions of miles of data. And with each mile, the predictive analytics of the system gets smarter.

All of these features enable fleet managers to confidently make decisions about where and when to service tires, minimizing disruptions and maximizing equipment utilization.

Unlike other truck systems, the technology capable of transforming fleet tire maintenance is mature and available now. The savings and intelligence enabled by Halo Connect will build a predictive maintenance foundation that larger investments in IoT and predictive maintenance practices can build on as they mature in the future.


Putting your fleet's tire performance ahead of the curve.



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Documents / Resources

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References

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